UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF RESEARCH AND DEVELOPMENT
NATIONAL HEALTH AND ENVIRONMENTAL EFFECTS
RESEARCH LABORATORY
RESEARCH TRIANGLE PARK, NC 27711

Neurotoxicology Division, MD-74B

MEMORANDUM

Date: February 1, 1999

Subject: Analysis of the Thyroid Hormone Data from the Rat Two Generation Reproduction Study (Argus, 1998b)

From: for Andrew M. Geller
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To: Annie Jarabek
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Attached is the statistical analysis of the hormone data from the Argus Rat Developmental Neurotoxicology Study (Argus, 1998b). A memo (York, 1999g) from Argus Laboratories (RE: Argus Protocol #1416-001, 20 November 1998) provided thyroid hormone and thyrotropin data from the oral (drinking water) two-generation reproductive study of ammonium perhclorate in the rat. Data were supplied on diskette in the form of ASCII text reports, one report for each gender/age group, and imported in ASCII form to SAS for further analysis. I have attached a description of how the analyses were done, a description of results, and summary graphs.

An alternative statistical analysis for the F1 generation, per suggestion by Joseph Haseman, is provided in the memo from Dennis House (1999) using these same data. These analyses have been provided for comparative purposes.

Analyses of Hormone Data from the Argus Oral (Drinking Water) Two-Generation Reproduction Study

Summary: A memo from Argus Laboratories (RE: Argus Protocol #1416-001, 20 November 1998) contains thyroid hormone and thyrotrophin data from the Oral (Drinking Water) Two-Generation reproduction Study of ammonium perchlorate in the rat. The following is a statistical analysis of the thyroid and pituitary hormone data (T4, thyroxine; T3, triiodothyronine; TSH, thyroid stimulating hormone) found in that report. At the time of this analysis, data were available from both the F0 generation, females and males sacrificed at 5 and 6 months of age, respectively, and the F1 generation, one male and one female from each litter, sacrificed on postnatal day 21 (PND21). Males were sacrificed after 13 weeks of exposure, i.e., approximately 91 days. Females were sacrificed after 16 weeks, i.e. at weaning, approximately 120 days of exposure.

Data from the F0 generation were re-analyzed to look for dose and gender effects. Data from the F1 generation were re-analyzed using gender as a repeated measure within each litter. Results of these re-analyses are similar to those stated in the memo from Argus RE: Protocol 1416-001 (20 November 1998).

For the F0 generation, a NOEL of 3.0 mg/kg/day was identified from a decrease in T4 and an increase in TSH of male rats. These results are consistent with the known mechanism-of-action (MOA) of perchlorate (inhibition of thyroid hormones). The increased TSH is likely a result of the activation of the pituitary-thyroid feedback mechanism. These data are not consistent with the results of the 90-day drinking water study (Springborn Laboratories, Inc., 1998). In that study, 90 days of exposure resulted in LOELs of 0.01 mg/kg/day for T3 and T4 and a NOEL of 0.05 mg/kg/day for TSH.

For the F1 generation, a LOAEL of 0.3 mg/kg/day was identified for a decrease in TSH level, inconsistent with known MOA of perchlorate. This data is inconsistent with results from the Neurodevelopmental Toxicity Study (Argus, 1998a, Crofton, 1998f). In the Neurodevelopmental study, dose-related decreases of T4 and T3 and dose-related increase of TSH were found. Possible reasons for this disparity are discussed.

Data: All data were supplied in the form of ASCII text reports, one report for each gender/age group. Data were exported as ASCII files for analyses by SAS.

F0 generation: Data for dependent measures (T4, T3 and TSH) were subjected to separate two-way ANOVAs. Treatment (dose) and sex were the independent between-subjects variables. Mean contrasts were performed using Tukey's Studentized Range (HSD) Test. Where there was a dose x sex interaction, separate one-way ANOVAs were run for each gender.

F1 generation: Data for dependent measures (T4, T3, TSH) were subjected to separate repeated-measures ANOVAs. Treatment (dose) was the independent between-subjects variable. Sex was a within-litter repeated-measures variable. The repeated-measures analysis requires a full set of data for each litter, i.e. 1 male and 1 female. Data was missing from 4 litters (1 male from each of 0, 0.3, and 30 mg/kg/day dose groups and 1 female from 30 mg/kg/day), reducing the sample size in the analysis from 99 to 95. Mean contrasts were performed using Tukey's

Studentized Range (HSD) Test.

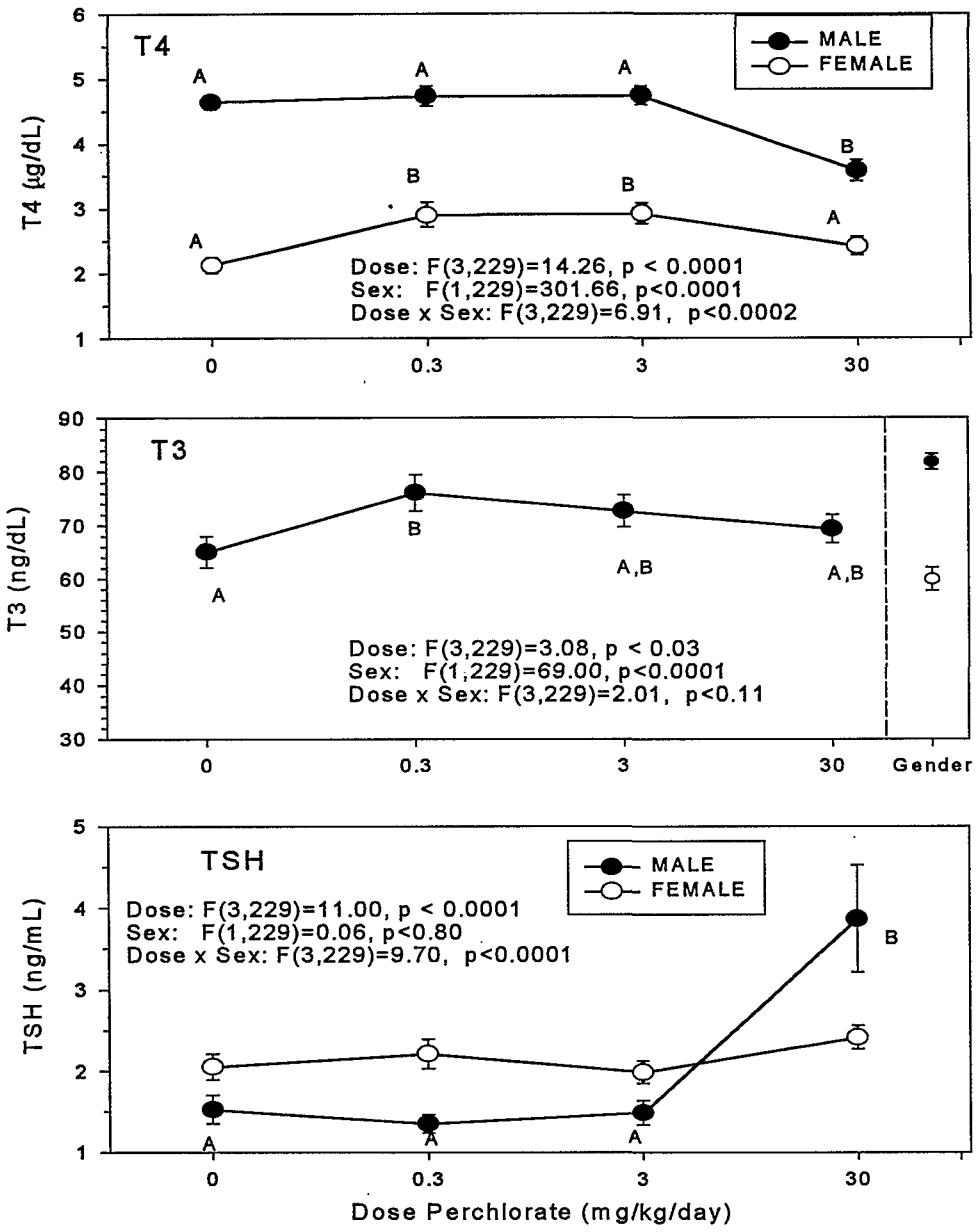
To correct for multiple comparisons (i.e., separate analyses for T4 and TSH) the acceptable alpha for significance (for all interaction main effects tests) was corrected to 0.029 (alpha of 0.05 divided by the square root of the number of ANOVAs). SAS analysis code and output are attached in Appendix 1.

Data Analysis - Results:

F0 Generation: There were significant dose effects for T4 and TSH, and dose x sex effects for T4 and TSH (Figure 1). Given our assumptions about the mechanism of action (MOA) of perchlorate (i.e., iodide uptake inhibition resulting in reduced levels of T4 and T3, and an increase in TSH), only the effects on T4 and TSH levels for males can be considered biologically significant. NOELs were identified for males only for T4 and TSH at a dose of 3.0 mg/kg/day. There were also significant effects of sex on T4 and T3 levels.

F1 Generation: There were no significant main effects of dose on T4, T3, or TSH. There were significant dose x sex interactions for T4 and TSH (Figure 2). The significant effect of dose on female T4 data is due to an elevated level in the 0.3 mg/kg/day group relative to the high dose group and is not consistent with the MOA of perchlorate. There was a LOEL of 0.3 mg/kg/day for a reduction in TSH level in males; this is not consistent with the known MOA of perchlorate.

These results are different from those in the F1 generation of the Neurodevelopmental Toxicity study (Argus, 1998a, Crofton, 1998f). In PND5 pups exposed through gestation and lactation, there were significant dose-related reductions in T4 and T3, and a significant dose-related increase in TSH. One possible source of this disparity is that the PND21 weanlings tested in the Two-Generation study likely received a reduced dose of the test compound through lactation (Fisher, 1998b) and the slow addition of drinking water to their diets. This may have allowed recovery from the hormone deficits due to gestational effects still visible in the younger pups.



Figure

1. Effects of oral perchlorate exposure on hormone levels in F0 generation. Serum total thyroxine (T4) (top): There were significant dose, sex, and dose x sex effects. Means with different letters (on each function) were significantly different ($p<0.05$). Serum total triiodothyronine (T3)(middle): There was a significant effects of sex and a borderline significant effect of dose. Plot to right of dotted line illustrates sex effect (males>females). Serum thyroid stimulation hormone (TSH) (bottom): There were significant effects of dose and dose x sex. Means with different letters were significantly different ($p<0.05$).

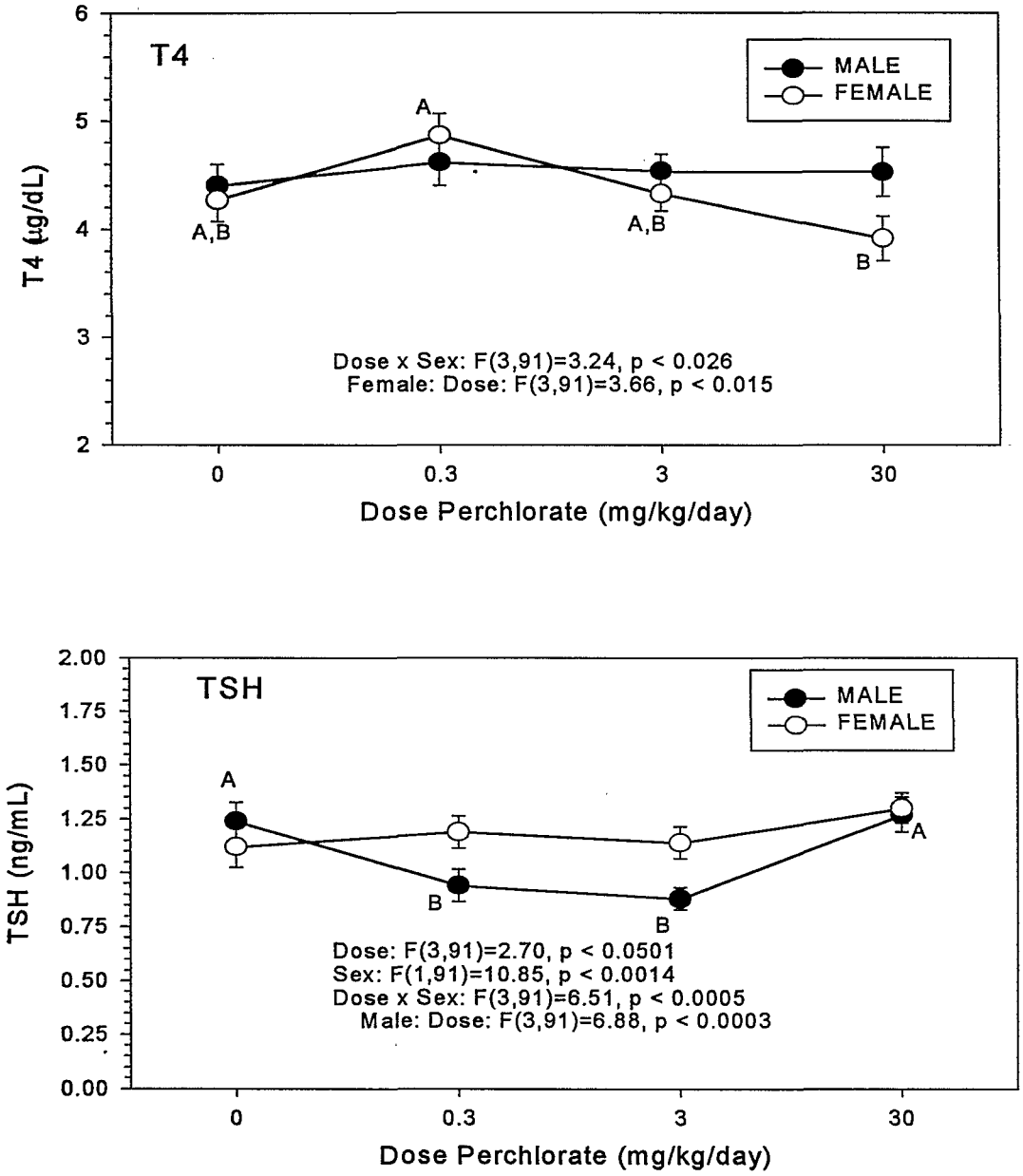


Figure 2. Effects of perchlorate exposure on hormone levels in F1 generation at post-natal day 21. Serum total thyroxine (T4) (top): There was a significant dose x sex effect, with a dose effect in females due to elevated T4 in the 0.3 mg/kg dose group. Means with different letters were significantly different ($p<0.05$). Serum thyroid stimulation hormone (TSH) (bottom): There were significant main effects of sex and dose x sex, with a dose effect in males. Means with different letters were significantly different ($p<0.05$).

APPENDIX 1 - Raw Data and Statistical Analysis

```
NOTE: Copyright (c) 1989-1996 by SAS Institute Inc., Cary, NC, USA.
NOTE: SAS (r) Proprietary Software Release 6.12  TS020
      Licensed to US ENVIRONMENTAL PROTECTION AGENCY, Site 0019614059.

NOTE: Running on ALPHASERVER Model 2100 5/300 Serial Number 80000000.


WARNING: Your system is scheduled to expire on February 18, 1999, which is 28 days from now. Please contact your installation
         representative to have your system renewed. The SAS system will no longer function on or after that date.
 Welcome to the NHEERL-RTP SAS Information Delivery System.


1          /* INPUT NEWLY RECEIVED THYROID HORMONE DATA FROM 2 GEN Reproduction STUDY.
2             DATA GENERATED BY ARGUS RESEARCH LABS, RECEIVED JAN 7, 1999 */
3
4          DATA F21; /* Female rats, generation F1,  day 21 */
WARNING: The BASE Product product with which DATASTEP is associated will expire within 30 days. Please contact your SAS
         installation representative to have it renewed.
5             INFILE '[GELLER.BMD]GEN2F21.DAT';
6             INPUT a $ no id grp sex $ age $ tsh1 t31 t41;
7             DROP a no sex;
8          RUN;

NOTE: The infile '[GELLER.BMD]GEN2F21.DAT' is:
      File=DSA21:[SAS$USERS.GELLER.BMD]GEN2F21.DAT

NOTE: 98 records were read from the infile '[GELLER.BMD]GEN2F21.DAT'.
      The minimum record length was 74.
      The maximum record length was 74.
NOTE: The data set WORK.F21 has 98 observations and 6 variables.

9
10         DATA M21; /* Male rats, generation F1, day 21 */
WARNING: The BASE Product product with which DATASTEP is associated will expire within 30 days. Please contact your SAS
         installation representative to have it renewed.
11            INFILE '[GELLER.BMD]GEN2M21.DAT';
12            INPUT a $ no id grp sex $ age $ tsh2 t32 t42;
13            DROP a no sex;
14         RUN;

NOTE: The infile '[GELLER.BMD]GEN2M21.DAT' is:
      File=DSA21:[SAS$USERS.GELLER.BMD]GEN2M21.DAT

NOTE: 96 records were read from the infile '[GELLER.BMD]GEN2M21.DAT'.
      The minimum record length was 74.
      The maximum record length was 74.
NOTE: The data set WORK.M21 has 96 observations and 6 variables.

15
16         PROC SORT DATA=f21;
WARNING: The BASE Product product with which SORT is associated will expire within 30 days. Please contact your SAS installation
         representative to have it renewed.
17            BY id;
18         RUN;

NOTE: The data set WORK.F21 has 98 observations and 6 variables.
```

```
 19
12                                                The SAS System                              09:23 Thursday, January 21, 1999

 20         PROC SORT DATA=m21;
WARNING: The BASE Product product with which SORT is associated will expire within 30 days. Please contact your SAS installation
         representative to have it renewed.
 21           BY id;
 22         RUN;

NOTE: The data set WORK.M21 has 96 observations and 6 variables.

 23
 24         DATA day21rep;
WARNING: The BASE Product product with which DATASTEP is associated will expire within 30 days. Please contact your SAS
         installation representative to have it renewed.
 25           MERGE f21 m21;
 26           BY id;
 27         RUN;

NOTE: The data set WORK.DAY21REP has 99 observations and 9 variables.

 28
 29         /*****************************************************************/
 30         /* For F0 generation, rats are not tracked by litter.  Therefore */
 31         /* simply concatenate the male and female data sets and analyze */
 32         /* with 2 way analysis of variance (grp, sex)                    */
 33         /*****************************************************************/
 34
 35         DATA F5M; /* Female rats, F0, 5 months */
WARNING: The BASE Product product with which DATASTEP is associated will expire within 30 days. Please contact your SAS
         installation representative to have it renewed.
 36           INFILE '[GELLER.BMD]GEN25MF.DAT';
 37           INPUT a $ no id grp sex $ age $ tsh t3 t4;
 38           DROP a no;
 39         RUN;

NOTE: The infile '[GELLER.BMD]GEN25MF.DAT' is:
      File=DSA21:[SAS$USERS.GELLER.BMD]GEN25MF.DAT

NOTE: 119 records were read from the infile '[GELLER.BMD]GEN25MF.DAT'.
      The minimum record length was 74.
      The maximum record length was 74.
NOTE: The data set WORK.F5M has 119 observations and 7 variables.

 40
 41         DATA M6M; /* Male rats, F0, 6 months */
WARNING: The BASE Product product with which DATASTEP is associated will expire within 30 days. Please contact your SAS
         installation representative to have it renewed.
 42           INFILE '[GELLER.BMD]GEN26MM.DAT';
 43           INPUT a $ no id grp sex $ age $ tsh t3 t4;
 44           DROP a no;
 45         RUN;

NOTE: The infile '[GELLER.BMD]GEN26MM.DAT' is:
      File=DSA21:[SAS$USERS.GELLER.BMD]GEN26MM.DAT

NOTE: 118 records were read from the infile '[GELLER.BMD]GEN26MM.DAT'.
      The minimum record length was 74.
      The maximum record length was 74.
```

```
NOTE: The data set WORK.M6M has 118 observations and 7 variables.

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 46
 47          PROC SORT DATA=f5m;
WARNING: The BASE Product product with which SORT is associated will expire within 30 days. Please contact your SAS installation
         representative to have it renewed.
 48            BY id;
 49          RUN;

NOTE: The data set WORK.F5M has 119 observations and 7 variables.

 50
 51          PROC SORT DATA=m6m;
WARNING: The BASE Product product with which SORT is associated will expire within 30 days. Please contact your SAS installation
         representative to have it renewed.
 52            BY id;
 53          RUN;

NOTE: The data set WORK.M6M has 118 observations and 7 variables.

 54
 55          DATA F0;
WARNING: The BASE Product product with which DATASTEP is associated will expire within 30 days. Please contact your SAS
         installation representative to have it renewed.
 56            set f5m m6m;
 57          RUN;

NOTE: The data set WORK.F0 has 237 observations and 7 variables.

 58
 59
 60          /*****************************************************************/
 61          /*  Analysis of F1, by dose group with sex as a repeated measure      */
 62          /*****************************************************************/
 63          PROC SORT DATA=day21rep;
WARNING: The BASE Product product with which SORT is associated will expire within 30 days. Please contact your SAS installation
         representative to have it renewed.
 64            BY grp;
 65          RUN;

NOTE: The data set WORK.DAY21REP has 99 observations and 9 variables.

 66
 67          PROC PRINT;
WARNING: The BASE Product product with which PRINT is associated will expire within 30 days. Please contact your SAS installation
         representative to have it renewed.
 68            TITLE1'Generation F1, DAY 21 data for repeated measures.';
 69            TITLE2'Suffix=1 for Females; Suffix=2 for Males.';
 70          RUN;

NOTE: The PROCEDURE PRINT printed pages 1-2.

 71
 72          PROC MEANS N MEAN STDERR STD MIN MAX;
WARNING: The BASE Product product with which MEANS is associated will expire within 30 days. Please contact your SAS installation
         representative to have it renewed.
 73            BY grp;
```

```
 74          VAR tsh1 t31 t41 tsh2 t32 t42;
 75          TITLE1'MEANS of Generation F1, DAY 21 data for repeated measures.';
 76          TITLE2'Suffix=1 for Females; Suffix=2 for Males.';
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 77        RUN;

NOTE: The PROCEDURE MEANS printed page 3.

 78
 79         PROC GLM DATA=day21rep;
WARNING: The SAS/STAT product with which GLM is associated will expire within 30 days. Please contact your SAS installation
         representative to have it renewed.
 80          CLASS grp;
 81          MODEL t41 t42=grp;
 82          REPEATED sex 2 /SUMMARY;
 83          MEANS grp /TUKEY LINES;
 84          TITLE1'Generation F1,DAY 21, T4';
 85          TITLE2'Suffix=1 for Females; Suffix=2 for Males.';
 86         RUN;

 87

NOTE: The PROCEDURE GLM printed pages 4-12.

 88         PROC GLM DATA=day21rep;
WARNING: The SAS/STAT product with which GLM is associated will expire within 30 days. Please contact your SAS installation
         representative to have it renewed.
 89          CLASS grp;
 90          model t31 t32=grp;
 91          REPEATED sex 2 /SUMMARY;
 92          MEANS grp /TUKEY LINES;
 93          TITLE1'Generation F1,DAY 21, T3';
 94          TITLE2'Suffix=1 for Females; Suffix=2 for Males.';
 95         RUN;

 96

NOTE: The PROCEDURE GLM printed pages 13-21.

 97         PROC GLM DATA=day21rep;
WARNING: The SAS/STAT product with which GLM is associated will expire within 30 days. Please contact your SAS installation
         representative to have it renewed.
 98          CLASS grp;
 99          model tsh1 tsh2=grp;
100          REPEATED sex 2 /SUMMARY;
101          MEANS grp /TUKEY LINES;
102          TITLE1'Generation F1,DAY 21, TSH';
103          TITLE2'Suffix=1 for Females; Suffix=2 for Males.';
104         RUN;

105          /*************************************************/
106         /*    ANALYSIS OF F0, BY DOSE GRP AND SEX        */
107        /*************************************************/

NOTE: The PROCEDURE GLM printed pages 22-30.

108         PROC SORT DATA=F0;
WARNING: The BASE Product product with which SORT is associated will expire within 30 days. Please contact your SAS installation
```

```
         representative to have it renewed.
109          BY grp sex;
110        RUN;

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NOTE: The data set WORK.F0 has 237 observations and 7 variables.

111
112        PROC PRINT DATA= F0;
WARNING: The BASE Product product with which PRINT is associated will expire within 30 days. Please contact your SAS installation
         representative to have it renewed.
113          TITLE1'DATA FROM F0 GENERATION';
114        RUN;

NOTE: The PROCEDURE 'PRINT printed pages 31-35.

115
116        PROC SORT DATA=F0;
WARNING: The BASE Product product with which SORT is associated will expire within 30 days. Please contact your SAS installation
         representative to have it renewed.
117          BY sex;
118        RUN;

NOTE: The data set WORK.F0 has 237 observations and 7 variables.

119
120        PROC MEANS N MEAN STDERR STD MIN MAX;
WARNING: The BASE Product product with which MEANS is associated will expire within 30 days. Please contact your SAS installation
         representative to have it renewed.
121          BY sex;
122          TITLE'F0 Generation, Means by SEX';
123        RUN;

NOTE: The PROCEDURE MEANS printed page 36.

124
125        PROC SORT DATA=F0;
WARNING: The BASE Product product with which SORT is associated will expire within 30 days. Please contact your SAS installation
         representative to have it renewed.
126          BY grp;
127        RUN;

NOTE: The data set WORK.F0 has 237 observations and 7 variables.

128
129        PROC MEANS N MEAN STDERR STD MIN MAX;
WARNING: The BASE Product product with which MEANS is associated will expire within 30 days. Please contact your SAS installation
         representative to have it renewed.
130          BY grp;
131          TITLE'F0 Generation, Means by Dose Group';
132        RUN;

NOTE: The PROCEDURE MEANS printed page 37.

133
134        PROC SORT DATA=F0;
WARNING: The BASE Product product with which SORT is associated will expire within 30 days. Please contact your SAS installation
         representative to have it renewed.
```

```
135          BY grp sex;
136        RUN;

NOTE: The data set WORK.F0 has 237 observations and 7 variables.

16                                    The SAS System                    09:23 Thursday, January 21, 1999

137
138        PROC MEANS N MEAN STDERR STD MIN MAX;
WARNING: The BASE Product product with which MEANS is associated will expire within 30 days. Please contact your SAS installation
         representative to have it renewed.
139          BY grp sex;
140          TITLE'F0 Generation, Means by Dose and Sex';
141        RUN;

NOTE: The PROCEDURE MEANS printed pages 38-39.

142
143        PROC GLM DATA=F0;
WARNING: The SAS/STAT product with which GLM is associated will expire within 30 days. Please contact your SAS installation
         representative to have it renewed.
144          CLASSES grp sex;
145          model t4 t3 tsh=grp|sex;
146          MEANS grp|sex /TUKEY LINES;
147          TITLE'Generation F0, ADULT';
148        RUN;

NOTE: Means from the MEANS statement are not adjusted for other terms in the model.  For adjusted means, use the LSMEANS statement.
149

NOTE: The PROCEDURE GLM printed pages 40-49.

150        PROC SORT DATA=F0;
WARNING: The BASE Product product with which SORT is associated will expire within 30 days. Please contact your SAS installation
         representative to have it renewed.
151          BY sex;
152        RUN;

NOTE: The data set WORK.F0 has 237 observations and 7 variables.

153
154        PROC GLM DATA=F0;
WARNING: The SAS/STAT product with which GLM is associated will expire within 30 days. Please contact your SAS installation
         representative to have it renewed.
155          BY sex;
156          CLASSES grp;
157          MODEL t4 t3 tsh=grp;
158          MEANS grp/TUKEY LINES;
159          TITLE1'Generation F0, ADULT';
160          TITLE2'Analysis by Sex';
161        RUN;

NOTE: Interactivity disabled with BY processing.
162
NOTE: The PROCEDURE GLM printed pages 50-63.

NOTE: SAS Institute Inc., SAS Campus Drive, Cary, NC USA 27513-2414
```

1 Generation F1, DAY 21 data for repeated measures. 09:23 Thursday, January 21, 1999 1
Suffix=1 for Females; Suffix=2 for Males.

OBS	ID	GRP	AGE	TSH1	T31	T41	TSH2	T32	T42
1	3801	0.0	21D	0.54	118.93	4.57	0.90	120.00	5.66
2	3802	0.0	21D	0.56	127.92	2.80	.	.	.
3	3803	0.0	21D	1.64	93.98	4.37	0.85	99.80	4.97
4	3804	0.0	21D	0.87	112.45	3.55	1.14	104.22	3.83
5	3805	0.0	21D	1.16	114.92	5.82	0.97	112.25	4.76
6	3806	0.0	21D	0.74	95.62	4.24	1.02	98.19	4.09
7	3807	0.0	21D	1.30	107.53	4.34	0.97	104.56	4.46
8	3808	0.0	21D	1.53	100.83	4.66	1.34	109.78	5.27
9	3809	0.0	21D	1.07	107.58	4.42	1.90	86.13	3.07
10	3810	0.0	21D	0.86	102.97	4.53	1.03	99.47	5.02
11	3811	0.0	21D	0.91	122.60	4.05	1.03	110.48	4.54
12	3812	0.0	21D	1.19	104.24	3.55	1.61	99.33	4.41
13	3813	0.0	21D	1.74	103.20	3.18	1.66	116.19	3.59
14	3814	0.0	21D	0.85	109.83	3.14	1.59	118.50	5.95
15	3815	0.0	21D	0.69	88.40	2.48	0.56	103.55	2.67
16	3816	0.0	21D	2.74	85.37	3.32	2.30	96.28	3.17
17	3818	0.0	21D	0.85	104.36	4.89	1.17	116.60	4.52
18	3819	0.0	21D	1.16	101.32	3.59	0.98	94.88	3.10
19	3821	0.0	21D	0.84	79.83	4.37	0.58	111.49	3.81
20	3822	0.0	21D	0.57	90.65	3.09	0.70	97.51	3.49
21	3823	0.0	21D	1.18	107.12	3.08	1.16	105.90	2.55
22	3824	0.0	21D	1.45	117.65	4.68	1.93	108.85	5.97
23	3825	0.0	21D	0.73	104.83	5.96	1.17	115.59	4.89
24	3826	0.0	21D	1.51	105.71	5.29	1.59	85.59	3.77
25	3827	0.0	21D	1.35	115.38	5.59	1.84	114.60	5.76
26	3828	0.0	21D	0.16	137.69	6.65	1.12	125.29	5.41
27	3829	0.0	21D	1.70	115.59	4.80	1.59	106.54	5.60
28	3830	0.0	21D	1.48	90.20	4.54	0.71	97.65	4.56
29	3831	0.3	21D	0.84	118.75	5.65	1.16	140.77	5.55
30	3833	0.3	21D	1.47	122.11	6.87	1.02	102.38	3.45
31	3834	0.3	21D	0.74	105.27	4.72	0.50	98.34	3.77
32	3837	0.3	21D	1.61	109.33	4.62	1.12	109.50	4.00
33	3838	0.3	21D	0.76	116.85	3.92	0.48	104.64	3.91
34	3842	0.3	21D	0.96	116.94	4.97	0.83	116.33	4.59
35	3843	0.3	21D	0.91	123.21	5.54	1.00	126.47	4.72
36	3845	0.3	21D	0.47	95.72	4.43	0.63	77.78	3.68
37	3846	0.3	21D	1.62	99.48	4.52	0.97	100.00	4.52
38	3847	0.3	21D	1.14	139.51	4.28	.	.	.
39	3848	0.3	21D	1.11	99.10	4.77	0.97	83.62	3.07
40	3849	0.3	21D	1.33	125.37	5.77	0.89	117.49	5.07
41	3850	0.3	21D	1.84	85.45	4.11	0.72	91.03	4.41
42	3851	0.3	21D	1.16	105.31	3.56	0.98	116.70	5.70
43	3852	0.3	21D	1.27	106.74	4.42	0.58	109.25	3.97
44	3854	0.3	21D	1.27	116.06	5.47	0.91	128.06	6.23
45	3855	0.3	21D	0.89	119.82	4.15	0.66	135.82	4.82
46	3856	0.3	21D	1.00	114.33	3.58	1.04	119.85	3.95
47	3857	0.3	21D	1.52	93.59	4.84	1.48	115.96	6.37
48	3858	0.3	21D	1.73	104.69	6.25	2.00	117.18	5.60
49	3859	0.3	21D	1.30	111.68	6.70	1.05	126.16	6.00
50	3860	0.3	21D	1.20	88.98	3.89	0.77	96.81	3.53
51	3861	3.0	21D	1.19	94.02	5.40	0.38	96.85	4.73
52	3862	3.0	21D	1.28	100.02	3.30	0.88	91.83	3.51
53	3863	3.0	21D	1.67	104.22	5.34	1.07	115.12	5.69
54	3864	3.0	21D	0.70	81.32	3.63	0.95	86.32	3.81
55	3865	3.0	21D	1.15	88.17	4.35	1.20	86.70	4.04

1 Generation F1, DAY 21 data for repeated measures. 09:23 Thursday, January 21, 1999 2
Suffix=1 for Females; Suffix=2 for Males.

OBS	ID	GRP	AGE	TSH1	T31	T41	TSH2	T32	T42
56	3866	3	21D	1.21	104.71	4.07	0.81	114.95	4.22
57	3867	3	21D	0.61	111.35	4.11	0.67	101.21	3.34
58	3868	3	21D	1.43	109.34	3.28	0.93	85.71	5.11
59	3869	3	21D	0.98	113.15	4.25	0.99	100.07	4.33
60	3872	3	21D	1.48	117.39	5.01	1.34	117.67	4.26
61	3873	3	21D	2.15	118.55	4.18	1.27	114.37	4.86
62	3875	3	21D	1.40	102.32	4.54	0.99	135.10	5.59
63	3876	3	21D	1.62	142.56	4.44	1.38	126.16	4.60
64	3877	3	21D	1.23	125.24	3.94	0.70	127.60	4.77
65	3878	3	21D	0.70	112.91	4.06	0.63	139.04	4.65
66	3879	3	21D	0.90	109.09	3.78	0.60	114.07	3.87
67	3880	3	21D	0.67	89.02	4.96	0.56	101.60	5.67
68	3882	3	21D	0.82	116.22	6.23	0.83	123.71	5.71
69	3883	3	21D	1.01	120.88	3.90	0.80	119.86	4.95
70	3884	3	21D	1.30	131.74	3.78	1.17	120.28	4.03
71	3885	3	21D	0.62	98.85	4.46	0.72	96.82	4.53
72	3887	3	21D	0.86	110.08	4.12	0.88	126.66	4.59
73	3888	3	21D	1.00	108.36	5.20	0.69	102.72	4.37
74	3889	3	21D	1.36	108.76	5.06	0.76	90.42	5.54
75	3890	3	21D	1.18	114.05	2.70	0.72	110.42	2.56
76	3891	30	21D	1.11	101.34	3.64	1.10	103.06	4.09
77	3892	30	21D	1.47	106.42	2.84	.	.	.
78	3893	30	21D	1.01	96.20	4.49	0.74	118.93	5.40
79	3894	30	21D	1.50	110.06	3.96	1.55	107.78	4.94
80	3895	30	21D	2.05	89.95	4.46	1.68	94.67	5.01
81	3897	30	21D	1.32	94.62	3.17	1.20	101.91	4.31
82	3899	30	21D	1.29	94.64	4.82	0.95	91.54	4.67
83	3900	30	21D	1.34	95.71	2.83	1.22	86.49	2.85
84	3901	30	21D	0.60	82.98	2.91	0.74	79.34	4.10
85	3902	30	21D	1.11	95.47	3.52	1.04	94.80	3.59
86	3904	30	21D	1.11	90.80	2.94	1.01	93.58	4.68
87	3905	30	21D	.	.	.	1.71	117.53	2.64
88	3906	30	21D	1.14	87.52	3.42	0.89	100.49	4.94
89	3907	30	21D	1.54	79.28	2.67	1.63	127.13	6.03
90	3910	30	21D	2.14	124.86	4.21	2.43	127.13	6.70
91	3911	30	21D	1.19	90.74	2.88	1.02	104.62	3.62
92	3912	30	21D	1.19	102.83	3.78	1.44	104.71	2.74
93	3913	30	21D	1.70	98.04	4.67	1.62	95.74	5.66
94	3915	30	21D	1.65	106.41	4.65	1.24	118.72	5.75
95	3916	30	21D	1.10	115.86	4.31	1.18	101.66	3.69
96	3917	30	21D	0.93	97.81	5.24	1.28	115.02	5.51
97	3918	30	21D	1.01	93.00	4.54	1.36	142.11	5.34
98	3919	30	21D	1.34	80.96	6.74	0.98	104.32	4.04
99	3920	30	21D	1.09	108.86	3.31	1.20	138.88	3.78

GRP=0

Variable	N	Mean	Std Error	Std Dev	Minimum	Maximum
TSH1	28	1.1203571	0.0964152	0.5101814	0.1600000	2.7400000
T31	28	105.9535714	2.4708986	13.0747665	79.8300000	137.6900000
T41	28	4.2696429	0.1926517	1.0194170	2.4800000	6.6500000
TSH2	27	1.2374074	0.0861880	0.4478461	0.5600000	2.3000000
T32	27	105.8970370	1.9197980	9.9755631	85.5900000	125.2900000
T42	27	4.4033333	0.1950272	1.0133911	2.5500000	5.9700000

GRP=0.3

Variable	N	Mean	Std Error	Std Dev	Minimum	Maximum
TSH1	22	1.1881818	0.0750574	0.3520503	0.4700000	1.8400000
T31	22	109.9222727	2.7857661	13.0664011	85.4500000	139.5100000
T41	22	4.8650000	0.2016799	0.9459626	3.5600000	6.8700000
TSH2	21	0.9409524	0.0745396	0.3415831	0.4800000	2.0000000
T32	21	111.1495238	3.5726718	16.3720391	77.7800000	140.7700000
T42	21	4.6147619	0.2137150	0.9793652	3.0700000	6.3700000

GRP=3

Variable	N	Mean	Std Error	Std Dev	Minimum	Maximum
TSH1	25	1.1408000	0.0749376	0.3746879	0.6100000	2.1500000
T31	25	109.2928000	2.7136494	13.5682468	81.3200000	142.5600000
T41	25	4.3236000	0.1555141	0.7775704	2.7000000	6.2300000
TSH2	25	0.8768000	0.0508747	0.2543737	0.3800000	1.3800000
T32	25	109.8104000	3.1385677	15.6928385	85.7100000	139.0400000
T42	25	4.5332000	0.1577939	0.7889694	2.5600000	5.7100000

GRP=30

Variable	N	Mean	Std Error	Std Dev	Minimum	Maximum
TSH1	23	1.3013043	0.0732916	0.3514943	0.6000000	2.1400000
T31	23	97.5808696	2.3031636	11.0455844	79.2800000	124.8600000
T41	23	3.9130435	0.2049751	0.9830261	2.6700000	6.7400000
TSH2	23	1.2700000	0.0795342	0.3814327	0.7400000	2.4300000
T32	23	107.3982609	3.3487192	16.0598932	79.3400000	142.1100000
T42	23	4.5252174	0.2264661	1.0860934	2.6400000	6.7000000

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Suffix=1 for Females; Suffix=2 for Males.

General Linear Models Procedure
Class Level Information

Class	Levels	Values
GRP	4	0 3 30 0.3

Number of observations in data set = 99

NOTE: Observations with missing values will not be included in this analysis. Thus, only 95 observations can be used in this analysis.

Suffix=1 for Females; Suffix=2 for Males.

General Linear Models Procedure

Dependent Variable: T41

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	9.51553209	3.17184403	3.66	0.0153
Error	91	78.81858370	0.86613828		
Corrected Total	94	88.33411579			

R-Square	C.V.	Root MSE	T41 Mean
0.107722	21.31723	0.93066551	4.36578947

Source	DF	Type I SS	Mean Square	F Value	Pr > F
GRP	3	9.51553209	3.17184403	3.66	0.0153

Source	DF	Type III SS	Mean Square	F Value	Pr > F
GRP	3	9.51553209	3.17184403	3.66	0.0153

Suffix=1 for Females; Suffix=2 for Males.

General Linear Models Procedure

Dependent Variable: T42

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	0.72784090	0.24261363	0.27	0.8499
Error	91	83.05904963	0.91273681		
Corrected Total	94	83.78689053			

R-Square	C.V.	Root MSE	T42 Mean
0.008687	21.07913	0.95537260	4.53231579

Source	DF	Type I SS	Mean Square	F Value	Pr > F
GRP	3	0.72784090	0.24261363	0.27	0.8499

Source	DF	Type III SS	Mean Square	F Value	Pr > F
GRP	3	0.72784090	0.24261363	0.27	0.8499

Suffix=1 for Females; Suffix=2 for Males.

General Linear Models Procedure
Repeated Measures Analysis of Variance
Repeated Measures Level Information

Dependent Variable	T41	T42
Level of SEX	1	2

Manova Test Criteria and Exact F Statistics for the Hypothesis of no SEX Effect
H = Type III SS&CP Matrix for SEX E = Error SS&CP Matrix

S=1 M=-0.5 N=44.5

Statistic	Value	F	Num DF	Den DF	Pr > F
Wilks' Lambda	0.97207577	2.6141	1	91	0.1094
Pillai's Trace	0.02792423	2.6141	1	91	0.1094
Hotelling-Lawley Trace	0.02872639	2.6141	1	91	0.1094
Roy's Greatest Root	0.02872639	2.6141	1	91	0.1094

Manova Test Criteria and Exact F Statistics for the Hypothesis of no SEX*GRP Effect
H = Type III SS&CP Matrix for SEX*GRP E = Error SS&CP Matrix

S=1 M=0.5 N=44.5

Statistic	Value	F	Num DF	Den DF	Pr > F
Wilks' Lambda	0.90340906	3.2432	3	91	0.0256
Pillai's Trace	0.09659094	3.2432	3	91	0.0256
Hotelling-Lawley Trace	0.10691828	3.2432	3	91	0.0256
Roy's Greatest Root	0.10691828	3.2432	3	91	0.0256

Suffix=1 for Females; Suffix=2 for Males.

General Linear Models Procedure
Repeated Measures Analysis of Variance
Tests of Hypotheses for Between Subjects Effects

Source	DF	Type III SS	Mean Square	F Value	Pr > F
GRP	3	5.48008956	1.82669652	1.42	0.2430
Error	91	117.32693992	1.28930703		

Suffix=1 for Females; Suffix=2 for Males.

General Linear Models Procedure
Repeated Measures Analysis of Variance
Univariate Tests of Hypotheses for Within Subject Effects

Source	DF	Type III SS	Mean Square	F Value	Pr > F	Adjusted G - G	Pr > F H - F
SEX	1	1.27978048	1.27978048	2.61	0.1094	.	.
SEX*GRP	3	4.76328344	1.58776115	3.24	0.0256	.	.
Error(SEX)	91	44.55069341	0.48956806				

Suffix=1 for Females; Suffix=2 for Males.

General Linear Models Procedure
Repeated Measures Analysis of Variance
Analysis of Variance of Contrast Variables

SEX.N represents the contrast between the nth level of SEX and the last

Contrast Variable: SEX.1

Source	DF	Type III SS	Mean Square	F Value	Pr > F
MEAN	1	2.55956097	2.55956097	2.61	0.1094
GRP	3	9.52656687	3.17552229	3.24	0.0256
Error	91	89.10138681	0.97913612		

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Suffix=1 for Females; Suffix=2 for Males.

General Linear Models Procedure

Tukey's Studentized Range (HSD) Test for variable: T41

NOTE: This test controls the type I experimentwise error rate, but generally has a higher type II error rate than REGWQ.

Alpha= 0.05 df= 91 MSE= 0.866138
Critical Value of Studentized Range= 3.701
Minimum Significant Difference= 0.7104
WARNING: Cell sizes are not equal.
Harmonic Mean of cell sizes= 23.51411

Means with the same letter are not significantly different.

Tukey Grouping	Mean	N	GRP
A	4.8929	21	0.3
A			
B A	4.3241	27	0
B A			
B A	4.3236	25	3
B			
B	3.9618	22	30

Suffix=1 for Females; Suffix=2 for Males.

General Linear Models Procedure

Tukey's Studentized Range (HSD) Test for variable: T42

NOTE: This test controls the type I experimentwise error rate, but generally has a higher type II error rate than REGWQ.

Alpha= 0.05 df= 91 MSE= 0.912737
Critical Value of Studentized Range= 3.701
Minimum Significant Difference= 0.7292
WARNING: Cell sizes are not equal.
Harmonic Mean of cell sizes= 23.51411

Means with the same letter are not significantly different.

Tukey Grouping	Mean	N	GRP
A	4.6148	21	0.3
A			
A	4.6109	22	30
A			
A	4.5332	25	3
A			
A	4.4033	27	0

Suffix=1 for Females; Suffix=2 for Males.

General Linear Models Procedure
Class Level Information

Class	Levels	Values
GRP	4	0 3 30 0.3

Number of observations in data set = 99

NOTE: Observations with missing values will not be included in this analysis. Thus, only 95 observations can be used in this analysis.

Suffix=1 for Females; Suffix=2 for Males.

General Linear Models Procedure

Dependent Variable: T31

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	2064.38182225	688.12727408	4.54	0.0052
Error	91	13804.23115248	151.69484783		
Corrected Total	94	15868.61297474			

R-Square	C.V.	Root MSE	T31 Mean
0.130092	11.71489	12.31644623	105.13494737

Source	DF	Type I SS	Mean Square	F Value	Pr > F
GRP	3	2064.38182225	688.12727408	4.54	0.0052

Source	DF	Type III SS	Mean Square	F Value	Pr > F
GRP	3	2064.38182225	688.12727408	4.54	0.0052

1 Generation F1,DAY 21, T3 09:23 Thursday, January 21, 1999 15
Suffix=1 for Females; Suffix=2 for Males.

General Linear Models Procedure

Dependent Variable: T32

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	424.20015417	141.40005139	0.66	0.5773
Error	91	19425.47154057	213.46672023		
Corrected Total	94	19849.67169474			

R-Square	C.V.	Root MSE	T32 Mean
0.021371	13.48716	14.61050034	108.32894737

Source	DF	Type I SS	Mean Square	F Value	Pr > F
GRP	3	424.20015417	141.40005139	0.66	0.5773

Source	DF	Type III SS	Mean Square	F Value	Pr > F
GRP	3	424.20015417	141.40005139	0.66	0.5773

Suffix=1 for Females; Suffix=2 for Males.

General Linear Models Procedure
Repeated Measures Analysis of Variance
Repeated Measures Level Information

Dependent Variable	T31	T32
Level of SEX	1	2

Manova Test Criteria and Exact F Statistics for the Hypothesis of no SEX Effect
H = Type III SS&CP Matrix for SEX E = Error SS&CP Matrix

S=1 M=-0.5 N=44.5

Statistic	Value	F	Num DF	Den DF	Pr > F
Wilks' Lambda	0.93817904	5.9964	1	91	0.0163
Pillai's Trace	0.06182096	5.9964	1	91	0.0163
Hotelling-Lawley Trace	0.06589462	5.9964	1	91	0.0163
Roy's Greatest Root	0.06589462	5.9964	1	91	0.0163

Manova Test Criteria and Exact F Statistics for the Hypothesis of no SEX*GRP Effect
H = Type III SS&CP Matrix for SEX*GRP E = Error SS&CP Matrix

S=1 M=0.5 N=44.5

Statistic	Value	F	Num DF	Den DF	Pr > F
Wilks' Lambda	0.92796295	2.3548	3	91	0.0772
Pillai's Trace	0.07203705	2.3548	3	91	0.0772
Hotelling-Lawley Trace	0.07762923	2.3548	3	91	0.0772
Roy's Greatest Root	0.07762923	2.3548	3	91	0.0772

Suffix=1 for Females; Suffix=2 for Males.

General Linear Models Procedure
Repeated Measures Analysis of Variance
Tests of Hypotheses for Between Subjects Effects

Source	DF	Type III SS	Mean Square	F Value	Pr > F
GRP	3	1841.56332307	613.85444102	2.24	0.0885
Error	91	24894.97280640	273.57112974		

Suffix=1 for Females; Suffix=2 for Males.

General Linear Models Procedure
Repeated Measures Analysis of Variance
Univariate Tests of Hypotheses for Within Subject Effects

Source	DF	Type III SS	Mean Square	F Value	Pr > F	Adjusted G - G	Pr > F H - F
SEX	1	549.21389263	549.21389263	6.00	0.0163	.	.
SEX*GRP	3	647.01865335	215.67288445	2.35	0.0772	.	.
Error(SEX)	91	8334.72988665	91.59043831				

Suffix=1 for Females; Suffix=2 for Males.

General Linear Models Procedure
Repeated Measures Analysis of Variance
Analysis of Variance of Contrast Variables

SEX.N represents the contrast between the nth level of SEX and the last

Contrast Variable: SEX.1

Source	DF	Type III SS	Mean Square	F Value	Pr > F
MEAN	1	1098.42778526	1098.42778526	6.00	0.0163
GRP	3	1294.03730671	431.34576890	2.35	0.0772
Error	91	16669.45977329	183.18087663		

1 Generation F1,DAY 21, T3 09:23 Thursday, January 21, 1999 20
Suffix=1 for Females; Suffix=2 for Males.

General Linear Models Procedure

Tukey's Studentized Range (HSD) Test for variable: T31

NOTE: This test controls the type I experimentwise error rate, but generally has a higher type II error rate than REGWQ.

Alpha= 0.05 df= 91 MSE= 151.6948
Critical Value of Studentized Range= 3.701
Minimum Significant Difference= 9.4008
WARNING: Cell sizes are not equal.
Harmonic Mean of cell sizes= 23.51411

Means with the same letter are not significantly different.

Tukey Grouping		Mean	N	GRP
	A	109.293	25	3
	A			
	A	108.513	21	0.3
	A			
B	A	105.140	27	0
B				
B		97.179	22	30

1 Generation F1,DAY 21, T3 09:23 Thursday, January 21, 1999 21
Suffix=1 for Females; Suffix=2 for Males.

General Linear Models Procedure

Tukey's Studentized Range (HSD) Test for variable: T32

NOTE: This test controls the type I experimentwise error rate, but generally has a higher type II error rate than REGWQ.

Alpha= 0.05 df= 91 MSE= 213.4667
Critical Value of Studentized Range= 3.701
Minimum Significant Difference= 11.152
WARNING: Cell sizes are not equal.
Harmonic Mean of cell sizes= 23.51411

Means with the same letter are not significantly different.

Tukey Grouping	Mean	N	GRP
A	111.150	21	0.3
A			
A	109.810	25	3
A			
A	106.938	22	30
A			
A	105.897	27	0

Suffix=1 for Females; Suffix=2 for Males.

General Linear Models Procedure
Class Level Information

Class	Levels	Values
GRP	4	0 3 30 0.3

Number of observations in data set = 99

NOTE: Observations with missing values will not be included in this analysis. Thus, only 95 observations can be used in this analysis.

1 Generation F1,DAY 21, TSH 09:23 Thursday, January 21, 1999 23
Suffix=1 for Females; Suffix=2 for Males.

General Linear Models Procedure

Dependent Variable: TSH1

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	0.36063343	0.12021114	0.71	0.5472
Error	91	15.36005500	0.16879181		
Corrected Total	94	15.72068842			

R-Square	C.V.	Root MSE	TSH1 Mean
0.022940	34.60419	0.41084281	1.18726316

Source	DF	Type I SS	Mean Square	F Value	Pr > F
GRP	3	0.36063343	0.12021114	0.71	0.5472

Source	DF	Type III SS	Mean Square	F Value	Pr > F
GRP	3	0.36063343	0.12021114	0.71	0.5472

1 Generation F1,DAY 21, TSH 09:23 Thursday, January 21, 1999 24
Suffix=1 for Females; Suffix=2 for Males.

General Linear Models Procedure

Dependent Variable: TSH2

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	2.74305548	0.91435183	6.88	0.0003
Error	91	12.09964347	0.13296312		
Corrected Total	94	14.84269895			

R-Square	C.V.	Root MSE	TSH2 Mean
0.184808	33.76635	0.36464108	1.07989474

Source	DF	Type I SS	Mean Square	F Value	Pr > F
GRP	3	2.74305548	0.91435183	6.88	0.0003

Source	DF	Type III SS	Mean Square	F Value	Pr > F
GRP	3	2.74305548	0.91435183	6.88	0.0003

1 Generation F1,DAY 21, TSH 09:23 Thursday, January 21, 1999 25
Suffix=1 for Females; Suffix=2 for Males.

General Linear Models Procedure
Repeated Measures Analysis of Variance
Repeated Measures Level Information

Dependent Variable	TSH1	TSH2
Level of SEX	1	2

Manova Test Criteria and Exact F Statistics for the Hypothesis of no SEX Effect
H = Type III SS&CP Matrix for SEX E = Error SS&CP Matrix

S=1 M=-0.5 N=44.5

Statistic	Value	F	Num DF	Den DF	Pr > F
Wilks' Lambda	0.89351379	10.8451	1	91	0.0014
Pillai's Trace	0.10648621	10.8451	1	91	0.0014
Hotelling-Lawley Trace	0.11917691	10.8451	1	91	0.0014
Roy's Greatest Root	0.11917691	10.8451	1	91	0.0014

Manova Test Criteria and Exact F Statistics for the Hypothesis of no SEX*GRP Effect
H = Type III SS&CP Matrix for SEX*GRP E = Error SS&CP Matrix

S=1 M=0.5 N=44.5

Statistic	Value	F	Num DF	Den DF	Pr > F
Wilks' Lambda	0.82339898	6.5058	3	91	0.0005
Pillai's Trace	0.17660102	6.5058	3	91	0.0005
Hotelling-Lawley Trace	0.21447806	6.5058	3	91	0.0005
Roy's Greatest Root	0.21447806	6.5058	3	91	0.0005

Suffix=1 for Females; Suffix=2 for Males.

General Linear Models Procedure
Repeated Measures Analysis of Variance
Tests of Hypotheses for Between Subjects Effects

Source	DF	Type III SS	Mean Square	F Value	Pr > F
GRP	3	1.98018483	0.66006161	2.70	0.0501
Error	91	22.22138149	0.24419101		

Suffix=1 for Females; Suffix=2 for Males.

General Linear Models Procedure
Repeated Measures Analysis of Variance
Univariate Tests of Hypotheses for Within Subject Effects

Source	DF	Type III SS	Mean Square	F Value	Pr > F	Adjusted G - G	Pr > F H - F
SEX	1	0.62428642	0.62428642	10.85	0.0014	.	.
SEX*GRP	3	1.12350407	0.37450136	6.51	0.0005	.	.
Error(SEX)	91	5.23831698	0.05756392				

Suffix=1 for Females; Suffix=2 for Males.

General Linear Models Procedure
Repeated Measures Analysis of Variance
Analysis of Variance of Contrast Variables

SEX.N represents the contrast between the nth level of SEX and the last

Contrast Variable: SEX.1

Source	DF	Type III SS	Mean Square	F Value	Pr > F
MEAN	1	1.24857284	1.24857284	10.85	0.0014
GRP	3	2.24700815	0.74900272	6.51	0.0005
Error	91	10.47663396	0.11512785		

1 Generation F1,DAY 21, TSH 09:23 Thursday, January 21, 1999 29
Suffix=1 for Females; Suffix=2 for Males.

General Linear Models Procedure

Tukey's Studentized Range (HSD) Test for variable: TSH1

NOTE: This test controls the type I experimentwise error rate, but generally has a higher type II error rate than REGWQ.

Alpha= 0.05 df= 91 MSE= 0.168792
Critical Value of Studentized Range= 3.701
Minimum Significant Difference= 0.3136
WARNING: Cell sizes are not equal.
Harmonic Mean of cell sizes= 23.51411

Means with the same letter are not significantly different.

Tukey Grouping	Mean	N	GRP
A	1.2936	22	30
A			
A	1.1905	21	0.3
A			
A	1.1411	27	0
A			
A	1.1408	25	3

1 Generation F1,DAY 21, TSH 09:23 Thursday, January 21, 1999 30
Suffix=1 for Females; Suffix=2 for Males.

General Linear Models Procedure

Tukey's Studentized Range (HSD) Test for variable: TSH2

NOTE: This test controls the type I experimentwise error rate, but generally has a higher type II error rate than REGWQ.

Alpha= 0.05 df= 91 MSE= 0.132963
Critical Value of Studentized Range= 3.701
Minimum Significant Difference= 0.2783
WARNING: Cell sizes are not equal.
Harmonic Mean of cell sizes= 23.51411

Means with the same letter are not significantly different.

Tukey Grouping	Mean	N	GRP
A	1.2500	22	30
A			
A	1.2374	27	0
B	0.9410	21	0.3
B			
B	0.8768	25	3

1 DATA FROM F0 GENERATION 09:23 Thursday, January 21, 1999 31

OBS	ID	GRP	SEX	AGE	TSH	T3	T4
1	3801	0	F	5M	0.72	27.62	1.79
2	3802	0	F	5M	3.51	88.20	4.35
3	3803	0	F	5M	0.84	23.88	1.05
4	3804	0	F	5M	1.66	55.70	1.45
5	3805	0	F	5M	1.31	56.03	2.47
6	3806	0	F	5M	2.46	36.57	2.23
7	3807	0	F	5M	1.82	48.65	2.04
8	3808	0	F	5M	1.59	62.75	2.98
9	3809	0	F	5M	1.39	62.30	2.02
10	3810	0	F	5M	2.41	44.70	2.80
11	3811	0	F	5M	1.44	50.48	2.06
12	3812	0	F	5M	1.86	47.12	1.68
13	3813	0	F	5M	2.77	43.52	2.43
14	3814	0	F	5M	1.36	52.48	2.16
15	3815	0	F	5M	1.80	68.54	2.10
16	3816	0	F	5M	3.16	108.80	1.58
17	3817	0	F	5M	1.31	68.48	2.64
18	3818	0	F	5M	1.50	159.25	1.45
19	3819	0	F	5M	2.59	41.89	1.45
20	3820	0	F	5M	1.59	114.68	3.17
21	3821	0	F	5M	2.08	44.07	1.11
22	3822	0	F	5M	5.24	60.97	1.93
23	3823	0	F	5M	1.97	43.95	1.90
24	3824	0	F	5M	1.83	24.39	1.34
25	3825	0	F	5M	2.05	53.42	1.88
26	3826	0	F	5M	2.41	40.63	2.33
27	3827	0	F	5M	2.00	38.53	1.83
28	3828	0	F	5M	2.20	47.03	2.46
29	3829	0	F	5M	2.82	60.18	2.44
30	3830	0	F	5M	1.93	58.28	2.67
31	3601	0	M	6M	1.19	88.35	5.07
32	3602	0	M	6M	0.93	84.17	4.35
33	3603	0	M	6M	0.62	79.49	5.66
34	3604	0	M	6M	0.80	82.88	5.33
35	3605	0	M	6M	2.16	86.13	5.19
36	3606	0	M	6M	1.18	93.42	4.36
37	3607	0	M	6M	1.05	63.72	3.81
38	3608	0	M	6M	1.80	69.21	4.18
39	3609	0	M	6M	4.41	72.29	4.12
40	3610	0	M	6M	1.40	68.40	4.82
41	3611	0	M	6M	0.84	61.11	4.24
42	3612	0	M	6M	1.45	61.69	4.84
43	3613	0	M	6M	0.56	71.49	4.94
44	3614	0	M	6M	1.81	83.01	4.56
45	3615	0	M	6M	1.08	77.97	5.39
46	3616	0	M	6M	3.04	69.67	3.84
47	3617	0	M	6M	1.34	71.30	4.95
48	3618	0	M	6M	2.08	51.76	3.18
49	3619	0	M	6M	0.42	68.45	4.49
50	3620	0	M	6M	0.95	66.34	5.01
51	3621	0	M	6M	2.42	62.40	4.30
52	3622	0	M	6M	1.48	96.45	4.44
53	3623	0	M	6M	3.67	61.89	4.17
54	3624	0	M	6M	0.35	73.45	4.35
55	3625	0	M	6M	1.88	80.55	4.11
56	3627	0	M	6M	1.35	55.93	5.37

OBS	ID	GRP	SEX	AGE	TSH	T3	T4
57	3628	0.0	M	6M	0.90	65.47	5.25
58	3629	0.0	M	6M	0.75	59.35	4.87
59	3630	0.0	M	6M	2.46	77.51	5.40
60	3831	0.3	F	5M	1.46	46.98	1.38
61	3832	0.3	F	5M	2.99	76.19	3.82
62	3833	0.3	F	5M	1.42	118.14	2.13
63	3834	0.3	F	5M	1.40	39.12	3.15
64	3835	0.3	F	5M	1.64	78.71	4.42
65	3836	0.3	F	5M	1.48	102.72	3.65
66	3837	0.3	F	5M	1.30	50.23	3.71
67	3838	0.3	F	5M	2.02	54.58	2.16
68	3839	0.3	F	5M	1.16	82.60	4.07
69	3840	0.3	F	5M	2.40	132.21	5.87
70	3841	0.3	F	5M	1.71	67.83	3.55
71	3842	0.3	F	5M	2.67	50.68	2.93
72	3843	0.3	F	5M	4.82	42.96	2.44
73	3844	0.3	F	5M	1.88	141.56	3.76
74	3845	0.3	F	5M	1.07	43.53	1.14
75	3846	0.3	F	5M	1.26	49.05	2.57
76	3847	0.3	F	5M	1.63	84.55	2.96
77	3848	0.3	F	5M	2.78	54.17	2.11
78	3849	0.3	F	5M	1.13	43.88	2.48
79	3850	0.3	F	5M	2.72	46.08	2.92
80	3851	0.3	F	5M	3.71	45.33	1.66
81	3852	0.3	F	5M	1.76	34.24	1.54
82	3853	0.3	F	5M	2.51	101.45	3.29
83	3854	0.3	F	5M	1.34	42.79	2.46
84	3855	0.3	F	5M	1.62	28.25	1.42
85	3856	0.3	F	5M	3.47	40.06	3.48
86	3857	0.3	F	5M	2.79	46.68	3.64
87	3858	0.3	F	5M	4.32	69.99	2.02
88	3859	0.3	F	5M	3.17	58.12	2.98
89	3860	0.3	F	5M	2.77	70.99	3.39
90	3631	0.3	M	6M	1.83	79.54	4.79
91	3632	0.3	M	6M	0.91	77.36	4.51
92	3633	0.3	M	6M	1.30	131.87	7.01
93	3634	0.3	M	6M	0.81	79.14	4.28
94	3635	0.3	M	6M	2.09	110.78	6.17
95	3636	0.3	M	6M	1.02	79.79	4.55
96	3637	0.3	M	6M	1.69	98.71	4.28
97	3638	0.3	M	6M	0.82	107.52	4.74
98	3639	0.3	M	6M	2.38	82.07	4.28
99	3640	0.3	M	6M	2.14	80.26	3.94
100	3641	0.3	M	6M	1.82	57.22	3.30
101	3642	0.3	M	6M	1.79	87.48	3.75
102	3643	0.3	M	6M	0.65	120.54	4.83
103	3644	0.3	M	6M	1.67	83.31	4.74
104	3645	0.3	M	6M	2.64	91.05	5.01
105	3646	0.3	M	6M	1.08	102.18	5.81
106	3647	0.3	M	6M	1.42	79.21	4.57
107	3648	0.3	M	6M	1.80	72.73	4.18
108	3649	0.3	M	6M	1.26	68.76	4.86
109	3650	0.3	M	6M	0.71	89.35	5.05
110	3651	0.3	M	6M	0.72	78.85	4.25
111	3652	0.3	M	6M	0.61	92.34	5.56
112	3653	0.3	M	6M	2.29	91.63	5.07

OBS	ID	GRP	SEX	AGE	TSH	T3	T4
113	3654	0.3	M	6M	0.31	109.01	5.63
114	3655	0.3	M	6M	0.78	80.77	4.05
115	3656	0.3	M	6M	1.08	70.67	3.80
116	3657	0.3	M	6M	1.43	91.65	5.36
117	3658	0.3	M	6M	1.17	73.19	4.18
118	3659	0.3	M	6M	0.29	74.18	3.57
119	3660	0.3	M	6M	2.07	80.52	5.66
120	3861	3.0	F	5M	1.71	47.40	3.05
121	3862	3.0	F	5M	3.25	65.02	3.67
122	3863	3.0	F	5M	0.87	61.89	2.24
123	3864	3.0	F	5M	0.62	47.74	1.36
124	3865	3.0	F	5M	2.36	42.31	2.07
125	3866	3.0	F	5M	1.46	49.32	2.56
126	3867	3.0	F	5M	2.72	49.26	2.15
127	3868	3.0	F	5M	2.26	48.82	2.20
128	3869	3.0	F	5M	1.09	45.46	2.24
129	3870	3.0	F	5M	1.80	89.35	3.60
130	3871	3.0	F	5M	1.52	85.38	4.03
131	3872	3.0	F	5M	2.11	58.63	2.69
132	3873	3.0	F	5M	2.29	45.69	2.68
133	3874	3.0	F	5M	1.92	90.35	3.97
134	3875	3.0	F	5M	2.16	53.03	3.06
135	3876	3.0	F	5M	2.88	42.69	1.46
136	3877	3.0	F	5M	3.26	52.51	2.74
137	3878	3.0	F	5M	1.50	63.21	4.25
138	3879	3.0	F	5M	1.27	38.87	1.64
139	3880	3.0	F	5M	1.44	53.24	2.68
140	3882	3.0	F	5M	1.41	58.15	2.82
141	3883	3.0	F	5M	3.87	46.05	2.90
142	3884	3.0	F	5M	1.19	75.50	3.59
143	3885	3.0	F	5M	1.44	43.87	3.15
144	3886	3.0	F	5M	2.53	70.42	4.63
145	3887	3.0	F	5M	2.46	47.75	3.83
146	3888	3.0	F	5M	1.38	50.40	2.42
147	3889	3.0	F	5M	2.27	59.71	3.69
148	3890	3.0	F	5M	2.67	52.14	3.43
149	3661	3.0	M	6M	1.29	81.05	5.05
150	3662	3.0	M	6M	2.84	99.22	3.73
151	3663	3.0	M	6M	1.54	92.30	6.09
152	3664	3.0	M	6M	1.36	102.47	4.29
153	3665	3.0	M	6M	1.71	102.42	5.34
154	3666	3.0	M	6M	0.68	67.87	4.79
155	3667	3.0	M	6M	1.39	88.38	4.39
156	3668	3.0	M	6M	0.39	68.59	4.96
157	3669	3.0	M	6M	1.22	75.98	5.99
158	3670	3.0	M	6M	1.91	98.88	4.76
159	3671	3.0	M	6M	3.76	82.85	4.58
160	3672	3.0	M	6M	0.87	90.33	5.27
161	3673	3.0	M	6M	1.40	90.58	4.17
162	3674	3.0	M	6M	1.32	90.37	4.38
163	3675	3.0	M	6M	1.03	84.18	4.57
164	3676	3.0	M	6M	0.90	72.26	4.74
165	3677	3.0	M	6M	0.87	79.72	4.73
166	3678	3.0	M	6M	0.38	69.36	3.34
167	3679	3.0	M	6M	2.47	85.77	3.79
168	3680	3.0	M	6M	1.36	74.30	5.45

OBS	ID	GRP	SEX	AGE	TSH	T3	T4
169	3681	3	M	6M	2.58	92.89	4.40
170	3682	3	M	6M	2.19	98.91	6.02
171	3683	3	M	6M	2.07	111.73	4.99
172	3684	3	M	6M	0.77	70.66	4.27
173	3685	3	M	6M	0.45	166.80	3.47
174	3686	3	M	6M	3.03	81.70	5.52
175	3687	3	M	6M	0.96	81.88	4.39
176	3688	3	M	6M	1.47	94.46	6.49
177	3689	3	M	6M	1.05	79.94	4.74
178	3690	3	M	6M	1.35	77.72	3.62
179	3891	30	F	5M	2.33	37.30	1.90
180	3892	30	F	5M	2.04	56.00	3.92
181	3893	30	F	5M	1.27	45.02	3.02
182	3894	30	F	5M	2.99	43.84	1.83
183	3895	30	F	5M	2.59	40.47	3.06
184	3896	30	F	5M	1.34	68.29	3.24
185	3897	30	F	5M	1.20	55.97	2.39
186	3898	30	F	5M	2.67	108.40	3.11
187	3899	30	F	5M	1.52	60.10	3.29
188	3900	30	F	5M	1.51	42.03	2.28
189	3901	30	F	5M	1.44	38.32	1.83
190	3902	30	F	5M	1.27	46.37	2.25
191	3903	30	F	5M	3.33	89.67	2.39
192	3904	30	F	5M	1.66	54.31	2.59
193	3905	30	F	5M	2.47	91.70	4.62
194	3906	30	F	5M	3.02	47.31	2.46
195	3907	30	F	5M	2.64	64.16	1.88
196	3908	30	F	5M	2.14	107.67	2.78
197	3909	30	F	5M	1.80	100.45	2.54
198	3910	30	F	5M	3.30	49.36	1.58
199	3911	30	F	5M	1.53	79.20	2.98
200	3912	30	F	5M	1.80	88.74	1.59
201	3913	30	F	5M	3.06	41.83	1.57
202	3914	30	F	5M	1.51	77.67	2.47
203	3915	30	F	5M	3.58	50.85	1.08
204	3916	30	F	5M	1.45	47.37	1.53
205	3917	30	F	5M	1.82	47.81	2.06
206	3918	30	F	5M	2.49	42.50	2.93
207	3919	30	F	5M	1.98	39.32	2.28
208	3920	30	F	5M	3.46	49.17	1.19
209	3691	30	M	6M	2.58	64.35	3.66
210	3692	30	M	6M	3.24	89.66	3.66
211	3693	30	M	6M	2.70	91.40	3.10
212	3694	30	M	6M	5.17	95.93	3.94
213	3695	30	M	6M	3.36	85.61	3.95
214	3696	30	M	6M	1.28	83.01	4.05
215	3697	30	M	6M	8.21	100.77	6.08
216	3699	30	M	6M	2.07	60.94	3.23
217	3700	30	M	6M	1.94	59.68	2.63
218	3701	30	M	6M	1.76	81.16	3.52
219	3702	30	M	6M	3.82	92.08	3.39
220	3703	30	M	6M	3.74	98.18	3.63
221	3704	30	M	6M	1.76	80.75	4.37
222	3705	30	M	6M	2.29	68.34	2.62
223	3706	30	M	6M	1.97	74.23	3.00
224	3707	30	M	6M	5.37	61.49	3.27

OBS	ID	GRP	SEX	AGE	TSH	T3	T4
225	3708	30	M	6M	1.13	84.65	2.10
226	3709	30	M	6M	14.15	71.72	1.57
227	3710	30	M	6M	13.31	74.04	2.99
228	3711	30	M	6M	1.14	71.23	4.50
229	3712	30	M	6M	1.93	70.55	4.18
230	3713	30	M	6M	7.40	71.35	4.45
231	3714	30	M	6M	1.05	64.68	3.00
232	3715	30	M	6M	1.79	116.75	4.08
233	3716	30	M	6M	1.97	89.85	4.68
234	3717	30	M	6M	0.94	66.63	3.19
235	3718	30	M	6M	8.27	78.42	3.95
236	3719	30	M	6M	6.87	54.88	3.35
237	3720	30	M	6M	1.04	76.21	3.61

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SEX=F

Variable	N	Mean	Std Error	Std Dev	Minimum	Maximum
ID	119	3860.33	3.1975080	34.8806948	3801.00	3920.00
GRP	119	8.3697479	1.1609977	12.6649895	0	30.0000000
TSH	119	2.1087395	0.0773778	0.8440927	0.6200000	5.2400000
T3	119	59.8497479	2.2107705	24.1166592	23.8800000	159.2500000
T4	119	2.5910084	0.0827259	0.9024331	1.0500000	5.8700000

SEX=M

Variable	N	Mean	Std Error	Std Dev	Minimum	Maximum
ID	118	3660.47	3.2002262	34.7633543	3601.00	3720.00
GRP	118	8.2118644	1.1549327	12.5457806	0	30.0000000
TSH	118	2.0492373	0.1953372	2.1219049	0.2900000	14.1500000
T3	118	81.8444068	1.5246098	16.5615013	51.7600000	166.8000000
T4	118	4.4274576	0.0832387	0.9042040	1.5700000	7.0100000

GRP=0

Variable	N	Mean	Std Error	Std Dev	Minimum	Maximum
ID	59	3717.02	13.2011036	101.3996007	3601.00	3830.00
TSH	59	1.7964407	0.1230441	0.9451195	0.3500000	5.2400000
T3	59	65.0328814	2.9519008	22.6739804	23.8800000	159.2500000
T4	59	3.3623729	0.1841824	1.4147320	1.0500000	5.6600000

GRP=0.3

Variable	N	Mean	Std Error	Std Dev	Minimum	Maximum
ID	60	3745.50	13.0675667	101.2209364	3631.00	3860.00
TSH	60	1.7830000	0.1202247	0.9312563	0.2900000	4.8200000
T3	60	76.0891667	3.3691531	26.0973476	28.2500000	141.5600000
T4	60	3.8146667	0.1684937	1.3051469	1.1400000	7.0100000

GRP=3

Variable	N	Mean	Std Error	Std Dev	Minimum	Maximum
ID	59	3773.71	13.1659384	101.1294921	3661.00	3890.00
TSH	59	1.7342373	0.1077443	0.8275998	0.3800000	3.8700000
T3	59	72.6733898	2.9975333	23.0244899	38.8700000	166.8000000
T4	59	3.8494915	0.1592210	1.2230000	1.3600000	6.4900000

GRP=30

Variable	N	Mean	Std Error	Std Dev	Minimum	Maximum
ID	59	3807.32	13.1611298	101.0925559	3691.00	3920.00
TSH	59	3.0077966	0.3421046	2.6277551	0.9400000	14.1500000
T3	59	69.3176271	2.6843263	20.6187013	37.3000000	116.7500000
T4	59	2.9896610	0.1308737	1.0052602	1.0800000	6.0800000

GRP=0 SEX=F

Variable	N	Mean	Std Error	Std Dev	Minimum	Maximum
ID	30	3815.50	1.6072751	8.8034084	3801.00	3830.00
TSH	30	2.0540000	0.1594023	0.8730825	0.7200000	5.2400000
T3	30	57.7696667	5.1493264	28.2040220	23.8800000	159.2500000
T4	30	2.1263333	0.1236620	0.6773248	1.0500000	4.3500000

GRP=0 SEX=M

Variable	N	Mean	Std Error	Std Dev	Minimum	Maximum
ID	29	3615.14	1.6209255	8.7289508	3601.00	3630.00
TSH	29	1.5300000	0.1777452	0.9571871	0.3500000	4.4100000
T3	29	72.5465517	2.0850083	11.2281134	51.7600000	96.4500000
T4	29	4.6410345	0.1083501	0.5834830	3.1800000	5.6600000

GRP=0.3 SEX=F

Variable	N	Mean	Std Error	Std Dev	Minimum	Maximum
ID	30	3845.50	1.6072751	8.8034084	3831.00	3860.00
TSH	30	2.2133333	0.1801745	0.9868561	1.0700000	4.8200000
T3	30	64.7890000	5.3452191	29.2769705	28.2500000	141.5600000
T4	30	2.9033333	0.1896520	1.0387670	1.1400000	5.8700000

GRP=0.3 SEX=M

Variable	N	Mean	Std Error	Std Dev	Minimum	Maximum
ID	30	3645.50	1.6072751	8.8034084	3631.00	3660.00
TSH	30	1.3526667	0.1165263	0.6382408	0.2900000	2.6400000
T3	30	87.3893333	2.9681270	16.2571009	57.2200000	131.8700000
T4	30	4.7260000	0.1492407	0.8174249	3.3000000	7.0100000

GRP=3 SEX=F

Variable	N	Mean	Std Error	Std Dev	Minimum	Maximum
ID	29	3875.31	1.6520650	8.8966424	3861.00	3890.00
TSH	29	1.9900000	0.1435424	0.7729997	0.6200000	3.8700000
T3	29	56.3503448	2.5982097	13.9917875	38.8700000	90.3500000
T4	29	2.9241379	0.1562495	0.8414296	1.3600000	4.6300000

GRP=3 SEX=M

Variable	N	Mean	Std Error	Std Dev	Minimum	Maximum
ID	30	3675.50	1.6072751	8.8034084	3661.00	3690.00
TSH	30	1.4870000	0.1488030	0.8150276	0.3800000	3.7600000
T3	30	88.4523333	3.4021201	18.6341793	67.8700000	166.8000000
T4	30	4.7440000	0.1442050	0.7898433	3.3400000	6.4900000

GRP=30 SEX=F

Variable	N	Mean	Std Error	Std Dev	Minimum	Maximum
ID	30	3905.50	1.6072751	8.8034084	3891.00	3920.00
TSH	30	2.1736667	0.1357876	0.7437393	1.2000000	3.5800000
T3	30	60.3733333	4.0112100	21.9703018	37.3000000	108.4000000
T4	30	2.4213333	0.1445999	0.7920063	1.0800000	4.6200000

GRP=30 SEX=M

Variable	N	Mean	Std Error	Std Dev	Minimum	Maximum
ID	29	3705.76	1.6420094	8.8424915	3691.00	3720.00
TSH	29	3.8706897	0.6489744	3.4948339	0.9400000	14.1500000
T3	29	78.5703448	2.6672331	14.3634900	54.8800000	116.7500000
T4	29	3.5775862	0.1596908	0.8599612	1.5700000	6.0800000

General Linear Models Procedure
Class Level Information

Class	Levels	Values
GRP	4	0 3 30 0.3
SEX	2	F M

Number of observations in data set = 237

General Linear Models Procedure

Dependent Variable: T4

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	7	241.25464107	34.46494872	52.50	0.0001
Error	229	150.32005345	0.65641945		
Corrected Total	236	391.57469451			

R-Square	C.V.	Root MSE	T4 Mean
0.616114	23.11310	0.81019717	3.50535865

Source	DF	Type I SS	Mean Square	F Value	Pr > F
GRP	3	29.62445542	9.87481847	15.04	0.0001
SEX	1	198.02136032	198.02136032	301.67	0.0001
GRP*SEX	3	13.60882533	4.53627511	6.91	0.0002

Source	DF	Type III SS	Mean Square	F Value	Pr > F
GRP	3	28.07875642	9.35958547	14.26	0.0001
SEX	1	198.01581342	198.01581342	301.66	0.0001
GRP*SEX	3	13.60882533	4.53627511	6.91	0.0002

General Linear Models Procedure

Dependent Variable: T3

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	7	34937.85388704	4991.12198386	12.10	0.0001
Error	229	94446.22560494	412.42893277		
Corrected Total	236	129384.07949198			

R-Square	C.V.	Root MSE	T3 Mean
0.270032	28.68383	20.30834638	70.80067511

Source	DF	Type I SS	Mean Square	F Value	Pr > F
GRP	3	3977.55083365	1325.85027788	3.21	0.0237
SEX	1	28467.84975054	28467.84975054	69.02	0.0001
GRP*SEX	3	2492.45330286	830.81776762	2.01	0.1127

Source	DF	Type III SS	Mean Square	F Value	Pr > F
GRP	3	3811.29675945	1270.43225315	3.08	0.0283
SEX	1	28458.69687677	28458.69687677	69.00	0.0001
GRP*SEX	3	2492.45330286	830.81776762	2.01	0.1127

General Linear Models Procedure

Dependent Variable: TSH

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	7	129.23442772	18.46206110	8.77	0.0001
Error	229	481.83968621	2.10410343		
Corrected Total	236	611.07411392			

R-Square	C.V.	Root MSE	TSH Mean
0.211487	69.76784	1.45055280	2.07911392

Source	DF	Type I SS	Mean Square	F Value	Pr > F
GRP	3	67.87744714	22.62581571	10.75	0.0001
SEX	1	0.15498515	0.15498515	0.07	0.7863
GRP*SEX	3	61.20199542	20.40066514	9.70	0.0001

Source	DF	Type III SS	Mean Square	F Value	Pr > F
GRP	3	69.42116553	23.14038851	11.00	0.0001
SEX	1	0.13455387	0.13455387	0.06	0.8006
GRP*SEX	3	61.20199542	20.40066514	9.70	0.0001

General Linear Models Procedure

Tukey's Studentized Range (HSD) Test for variable: T4

NOTE: This test controls the type I experimentwise error rate, but generally has a higher type II error rate than REGWQ.

Alpha= 0.05 df= 229 MSE= 0.656419
Critical Value of Studentized Range= 3.660
Minimum Significant Difference= 0.3852
WARNING: Cell sizes are not equal.
Harmonic Mean of cell sizes= 59.24686

Means with the same letter are not significantly different.

Tukey Grouping	Mean	N	GRP
A	3.8495	59	3
A			
A	3.8147	60	0.3
B	3.3624	59	0
B			
B	2.9897	59	30

General Linear Models Procedure

Tukey's Studentized Range (HSD) Test for variable: T3

NOTE: This test controls the type I experimentwise error rate, but generally has a higher type II error rate than REGWQ.

Alpha= 0.05 df= 229 MSE= 412.4289
Critical Value of Studentized Range= 3.660
Minimum Significant Difference= 9.6566
WARNING: Cell sizes are not equal.
Harmonic Mean of cell sizes= 59.24686

Means with the same letter are not significantly different.

Tukey Grouping		Mean	N	GRP
	A	76.089	60	0.3
	A			
B	A	72.673	59	3
B	A			
B	A	69.318	59	30
B				
B		65.033	59	0

General Linear Models Procedure

Tukey's Studentized Range (HSD) Test for variable: TSH

NOTE: This test controls the type I experimentwise error rate, but generally has a higher type II error rate than REGWQ.

Alpha= 0.05 df= 229 MSE= 2.104103
Critical Value of Studentized Range= 3.660
Minimum Significant Difference= 0.6897
WARNING: Cell sizes are not equal.
Harmonic Mean of cell sizes= 59.24686

Means with the same letter are not significantly different.

Tukey Grouping	Mean	N	GRP
A	3.0078	59	30
B	1.7964	59	0
B			
B	1.7830	60	0.3
B			
B	1.7342	59	3

General Linear Models Procedure

Tukey's Studentized Range (HSD) Test for variable: T4

NOTE: This test controls the type I experimentwise error rate, but generally has a higher type II error rate than REGWQ.

Alpha= 0.05 df= 229 MSE= 0.656419
Critical Value of Studentized Range= 2.787
Minimum Significant Difference= 0.2074
WARNING: Cell sizes are not equal.
Harmonic Mean of cell sizes= 118.4979

Means with the same letter are not significantly different.

Tukey Grouping	Mean	N	SEX
A	4.4275	118	M
B	2.5910	119	F

General Linear Models Procedure

Tukey's Studentized Range (HSD) Test for variable: T3

NOTE: This test controls the type I experimentwise error rate, but generally has a higher type II error rate than REGWQ.

Alpha= 0.05 df= 229 MSE= 412.4289
Critical Value of Studentized Range= 2.787
Minimum Significant Difference= 5.1986
WARNING: Cell sizes are not equal.
Harmonic Mean of cell sizes= 118.4979

Means with the same letter are not significantly different.

Tukey Grouping	Mean	N	SEX
A	81.844	118	M
B	59.850	119	F

General Linear Models Procedure

Tukey's Studentized Range (HSD) Test for variable: TSH

NOTE: This test controls the type I experimentwise error rate, but generally has a higher type II error rate than REGWQ.

Alpha= 0.05 df= 229 MSE= 2.104103
Critical Value of Studentized Range= 2.787
Minimum Significant Difference= 0.3713
WARNING: Cell sizes are not equal.
Harmonic Mean of cell sizes= 118.4979

Means with the same letter are not significantly different.

Tukey Grouping	Mean	N	SEX
A	2.1087	119	F
A			
A	2.0492	118	M

Level of GRP	Level of SEX	N	T4 Mean	T4 SD	T3 Mean	T3 SD	TSH Mean	TSH SD
0	F	30	2.12633333	0.67732477	57.7696667	28.2040220	2.05400000	0.87308253
0	M	29	4.64103448	0.58348304	72.5465517	11.2281134	1.53000000	0.95718710
3	F	29	2.92413793	0.84142955	56.3503448	13.9917875	1.99000000	0.77299972
3	M	30	4.74400000	0.78984328	88.4523333	18.6341793	1.48700000	0.81502761
30	F	30	2.42133333	0.79200633	60.3733333	21.9703018	2.17366667	0.74373931
30	M	29	3.57758621	0.85996119	78.5703448	14.3634900	3.87068966	3.49483387
0.3	F	30	2.90333333	1.03876695	64.7890000	29.2769705	2.21333333	0.98685615
0.3	M	30	4.72600000	0.81742489	87.3893333	16.2571009	1.35266667	0.63824076

---------- SEX=F ----------

General Linear Models Procedure
Class Level Information

Class	Levels	Values
GRP	4	0 3 30 0.3

Number of observations in by group = 119

SEX=F

General Linear Models Procedure

Dependent Variable: T4

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	13.48606554	4.49535518	6.26	0.0006
Error	115	82.61141345	0.71836012		
Corrected Total	118	96.09747899			

R-Square	C.V.	Root MSE	T4 Mean
0.140337	32.71164	0.84756128	2.59100840

Source	DF	Type I SS	Mean Square	F Value	Pr > F
GRP	3	13.48606554	4.49535518	6.26	0.0006

Source	DF	Type III SS	Mean Square	F Value	Pr > F
GRP	3	13.48606554	4.49535518	6.26	0.0006

---------- SEX=F ----------

General Linear Models Procedure

Dependent Variable: T3

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	1225.04156255	408.34718752	0.70	0.5559
Error	115	67405.32192989	586.13323417		
Corrected Total	118	68630.36349244			

R-Square	C.V.	Root MSE	T3 Mean
0.017850	40.45161	24.21018864	59.84974790

Source	DF	Type I SS	Mean Square	F Value	Pr > F
GRP	3	1225.04156255	408.34718752	0.70	0.5559

Source	DF	Type III SS	Mean Square	F Value	Pr > F
GRP	3	1225.04156255	408.34718752	0.70	0.5559

---------- SEX=F ----------

General Linear Models Procedure

Dependent Variable: TSH

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	0.95342759	0.31780920	0.44	0.7250
Error	115	83.12068333	0.72278855		
Corrected Total	118	84.07411092			

R-Square	C.V.	Root MSE	TSH Mean
0.011340	40.31649	0.85016972	2.10873950

Source	DF	Type I SS	Mean Square	F Value	Pr > F
GRP	3	0.95342759	0.31780920	0.44	0.7250

Source	DF	Type III SS	Mean Square	F Value	Pr > F
GRP	3	0.95342759	0.31780920	0.44	0.7250

---------- SEX=F ----------

General Linear Models Procedure

Tukey's Studentized Range (HSD) Test for variable: T4

NOTE: This test controls the type I experimentwise error rate, but generally has a higher type II error rate than REGWQ.

Alpha= 0.05 df= 115 MSE= 0.71836
Critical Value of Studentized Range= 3.687
Minimum Significant Difference= 0.573
WARNING: Cell sizes are not equal.
Harmonic Mean of cell sizes= 29.74359

Means with the same letter are not significantly different.

Tukey Grouping	Mean	N	GRP
A	2.9241	29	3
A			
A	2.9033	30	0.3
A			
B A	2.4213	30	30
B			
B	2.1263	30	0

---------- SEX=F ----------

General Linear Models Procedure

Tukey's Studentized Range (HSD) Test for variable: T3

NOTE: This test controls the type I experimentwise error rate, but generally has a higher type II error rate than REGWQ.

Alpha= 0.05 df= 115 MSE= 586.1332
Critical Value of Studentized Range= 3.687
Minimum Significant Difference= 16.367
WARNING: Cell sizes are not equal.
Harmonic Mean of cell sizes= 29.74359

Means with the same letter are not significantly different.

Tukey Grouping	Mean	N	GRP
A	64.789	30	0.3
A			
A	60.373	30	30
A			
A	57.770	30	0
A			
A	56.350	29	3

---------- SEX=F ----------

General Linear Models Procedure

Tukey's Studentized Range (HSD) Test for variable: TSH

NOTE: This test controls the type I experimentwise error rate, but generally has a higher type II error rate than REGWQ.

Alpha= 0.05 df= 115 MSE= 0.722789
Critical Value of Studentized Range= 3.687
Minimum Significant Difference= 0.5747
WARNING: Cell sizes are not equal.
Harmonic Mean of cell sizes= 29.74359

Means with the same letter are not significantly different.

Tukey Grouping	Mean	N	GRP
A	2.2133	30	0.3
A			
A	2.1737	30	30
A			
A	2.0540	30	0
A			
A	1.9900	29	3

---------- SEX=M ----------

General Linear Models Procedure
Class Level Information

Class	Levels	Values
GRP	4	0 3 30 0.3

Number of observations in by group = 118

SEX=M

General Linear Models Procedure

Dependent Variable: T4

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	27.94879729	9.31626576	15.69	0.0001
Error	114	67.70864000	0.59393544		
Corrected Total	117	95.65743729			

R-Square	C.V.	Root MSE	T4 Mean
0.292176	17.40665	0.77067207	4.42745763

Source	DF	Type I SS	Mean Square	F Value	Pr > F
GRP	3	27.94879729	9.31626576	15.69	0.0001

Source	DF	Type III SS	Mean Square	F Value	Pr > F
GRP	3	27.94879729	9.31626576	15.69	0.0001

---------- SEX=M ----------

General Linear Models Procedure

Dependent Variable: T3

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	5050.24523342	1683.41507781	7.10	0.0002
Error	114	27040.90367506	237.20090943		
Corrected Total	117	32091.14890847			

R-Square	C.V.	Root MSE	T3 Mean
0.157372	18.81781	15.40132817	81.84440678

Source	DF	Type I SS	Mean Square	F Value	Pr > F
GRP	3	5050.24523342	1683.41507781	7.10	0.0002

Source	DF	Type III SS	Mean Square	F Value	Pr > F
GRP	3	5050.24523342	1683.41507781	7.10	0.0002

SEX=M

General Linear Models Procedure

Dependent Variable: TSH

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	128.07122848	42.69040949	12.21	0.0001
Error	114	398.71900287	3.49753511		
Corrected Total	117	526.79023136			

R-Square	C.V.	Root MSE	TSH Mean
0.243116	91.26175	1.87016981	2.04923729

Source	DF	Type I SS	Mean Square	F Value	Pr > F
GRP	3	128.07122848	42.69040949	12.21	0.0001

Source	DF	Type III SS	Mean Square	F Value	Pr > F
GRP	3	128.07122848	42.69040949	12.21	0.0001

---------- SEX=M ----------

General Linear Models Procedure

Tukey's Studentized Range (HSD) Test for variable: T4

NOTE: This test controls the type I experimentwise error rate, but generally has a higher type II error rate than REGWQ.

Alpha= 0.05 df= 114 MSE= 0.593935
Critical Value of Studentized Range= 3.687
Minimum Significant Difference= 0.5233
WARNING: Cell sizes are not equal.
Harmonic Mean of cell sizes= 29.49153

Means with the same letter are not significantly different.

Tukey Grouping	Mean	N	GRP
A	4.7440	30	3
A			
A	4.7260	30	0.3
A			
A	4.6410	29	0
B	3.5776	29	30

---------- SEX=M ----------

General Linear Models Procedure

Tukey's Studentized Range (HSD) Test for variable: T3

NOTE: This test controls the type I experimentwise error rate, but generally has a higher type II error rate than REGWQ.

Alpha= 0.05 df= 114 MSE= 237.2009
Critical Value of Studentized Range= 3.687
Minimum Significant Difference= 10.457
WARNING: Cell sizes are not equal.
Harmonic Mean of cell sizes= 29.49153

Means with the same letter are not significantly different.

Tukey Grouping		Mean	N	GRP
	A	88.452	30	3
	A			
	A	87.389	30	0.3
	A			
B	A	78.570	29	30
B				
B		72.547	29	0

---------- SEX=M ----------

General Linear Models Procedure

Tukey's Studentized Range (HSD) Test for variable: TSH

NOTE: This test controls the type I experimentwise error rate, but generally has a higher type II error rate than REGWQ.

Alpha= 0.05 df= 114 MSE= 3.497535
Critical Value of Studentized Range= 3.687
Minimum Significant Difference= 1.2698
WARNING: Cell sizes are not equal.
Harmonic Mean of cell sizes= 29.49153

Means with the same letter are not significantly different.

Tukey Grouping	Mean	N	GRP
A	3.8707	29	30
B	1.5300	29	0
B			
B	1.4870	30	3
B			
B	1.3527	30	0.3